Available online at www.sciencedirect.com

SCIENCE DIRECT®

Electronic Notes in Theoretical Computer Science

Electronic Notes in Theoretical Computer Science

www.elsevier.com/locate/entcs

Contract-based Mutation Testing in the Refinement Calculus

Bernhard K. Aichernig

The United Nations University International Institute for Software Technology (UNU/IIST) P. O. Box 3058, Macao, code China
{*bka*}*@iist.unu.edu*

Abstract

This article discusses mutation testing strategies in the context of refinement. Here, a novel generalization of mutation testing techniques is presented to be applied to contracts ranging from formal specifications to programs. It is demonstrated that refinement and its dual abstraction are the key notions leading to a precise and yet simple theory of mutation testing. The refinement calculus of Back and von Wright is used to express the concepts like contracts, useful mutations, test-cases and test-coverage.

Keywords: formal methods, formal specifications, mutation testing, refinement, abstraction, test-case synthesis, test-coverage

10.1016/S1571-0661(05)82561-7